FUJITSU SEMICONDUCTOR
DATA SHEET

DS04-21711-1E

ASSP for DTS

Piezoelectric VCO
(6 to 30 MHz)

M3 Series (E100)

■ DESCRIPTION

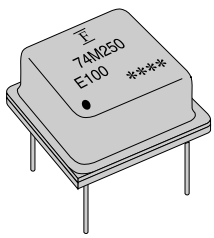
The M3 series (E100) of VCO (Voltage Controlled Oscillator) apply to the frequency range 70-300 MHz.

The M3 series uses a single lithium tantalate piezoelectric crystal (LiTaO3) that has large electromechanical coupling coefficient, and a unique SAW resonator. That provides wide bandwidths, and exceptional stability in VHF band until 300MHz.

■ FEATURES

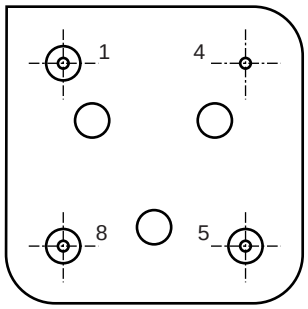
- Frequency range: 70 to 300MHz
- Wide frequency controllable range: Over than ±1600 ppm (0.5 to 4.5 V)
- Excellent temperature stability: ±200 ppm or less (-10 to 70 °C)
- No adjustment is required due to high accuracy oscillation frequency (±300 ppm or less)
- Highly reliable hermetically sealed package
- High carrier noise ratio: -90dB or less (Detuning;12.5kHz, bandwidth; 8kHz)
- Small type, and compatible with 8-pin DIP IC

■ PACKAGE



■ PIN ASSIGNMENT

(Bottom View)



■ PIN DESCRIPTIONS

Pin No.	Symbol	Descriptions
1	V_{IN}	Input (Control voltage)
4	GND	Ground
5	Pout	Output
8	V_{CC}	Supply voltage

■ ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Rating		Unit
		Min.	Max.	
Supply voltage	V_{CC}	–0.5	+7.0	V
Input control voltage	V_{IN}	–0.5	+7.0	V
Operating temperature	Ta	–10	+70	°C
Storage temperature	Tstg	–40	+100	°C
Oscillation frequency range	—	70	300	MHz

WARNING: Piezoelectric devices can be permanently damaged by application of stress (voltage, current, temperature, etc.) in excess of absolute maximum ratings. Do not exceed these ratings.

■ RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Value		Unit
		Min.	Max.	
Supply voltage	V_{CC}	+ 4.5	+ 5.5	V
Input control voltage	V_{IN}	0.0	+ 5.0	V
Operating temperature	Ta	–10	+70	°C
Control electrode	—	Straight polarity		—

WARNING: The recommended operating conditions are required in order to ensure the normal operation of the piezoelectric device. All of the device's electrical characteristics are warranted when the device is operated within these ranges.

Always use piezoelectric devices within their recommended operating condition ranges. Operation outside these ranges may adversely affect reliability and could result in device failure.

No warranty is made with respect to uses, operating conditions, or combinations not represented on the data sheet. Users considering application outside the listed conditions are advised to contact their FUJITSU representatives beforehand.

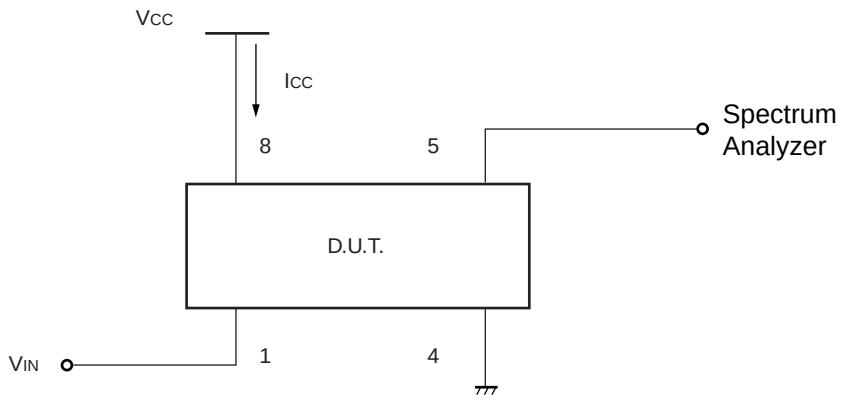
■ STANDARD FREQUENCIES

Nominal frequency	Application	Part number
70.0 MHz	Wireless	FAR-M3DC-70M000-E100
74.25 MHz	HDTV	FAR-M3DC-74M250-E100
97.2 MHz	HDTV	FAR-M3DC-97M200-E100
155.52 MHz	B-ISDN	FAR-M3DC-155M52-E100

■ ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min.	Typ.	Max.		
Supply current	I_{CC}	Without load	—	—	+30	mA	
Deviation of oscillation frequency	f_O	V_{IN} = 2.5 V	–300	—	+300	ppm	Nominal frequency reference
Oscillation frequency	Δf_L	V_{IN} = 0.5 V	—	—	–1600	ppm	V_{IN} = 2.5 V reference
	Δf_H	V_{IN} = 4.5 V	+1600	—	—	ppm	
Frequency supply voltage stability	$\Delta f (V_{CC})$	V_{CC} = 5 V ± 5%	–100	—	+100	ppm	V_{IN} = 2.5 V V_{CC} = 5 V reference
Output power	P_{OUT}	V_{IN} = 2.5 V	+2.0	—	—	dBm	50 Ω terminated
Output power stability	ΔP	V_{IN} = 0.5 to 4.5 V	–2	—	+2	dB	V_{IN} = 2.5 V reference
Frequency stability with temperature	Δf (Ta)	Ta = –10 to 70 °C V_{IN} = 2.5 V	–200	—	+200	ppm	25 °C reference
Output power stability with temperature	ΔP (Ta)	Ta = –10 to 70 °C V_{IN} = 2.5 V	–2	—	+2	dB	25 °C reference

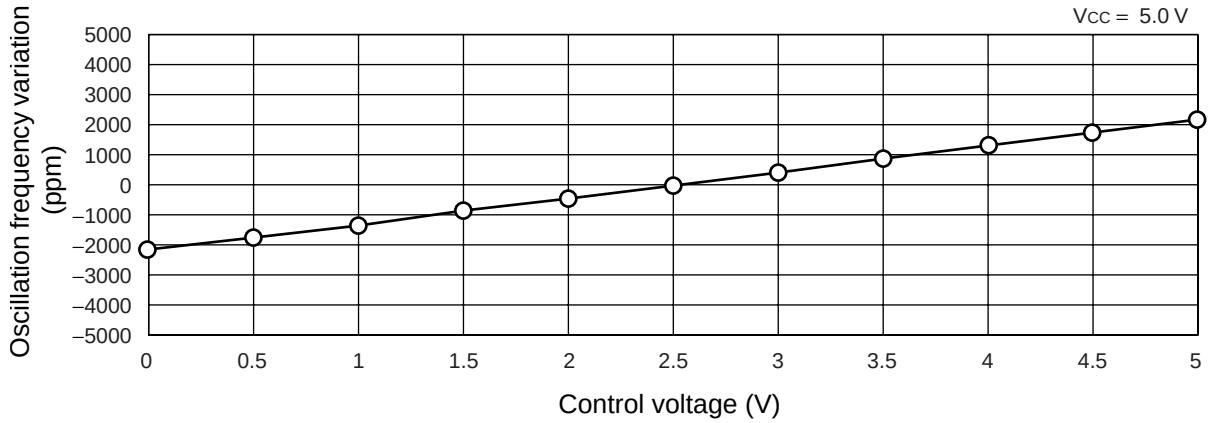
■ MEASURMENT CIRCUIT



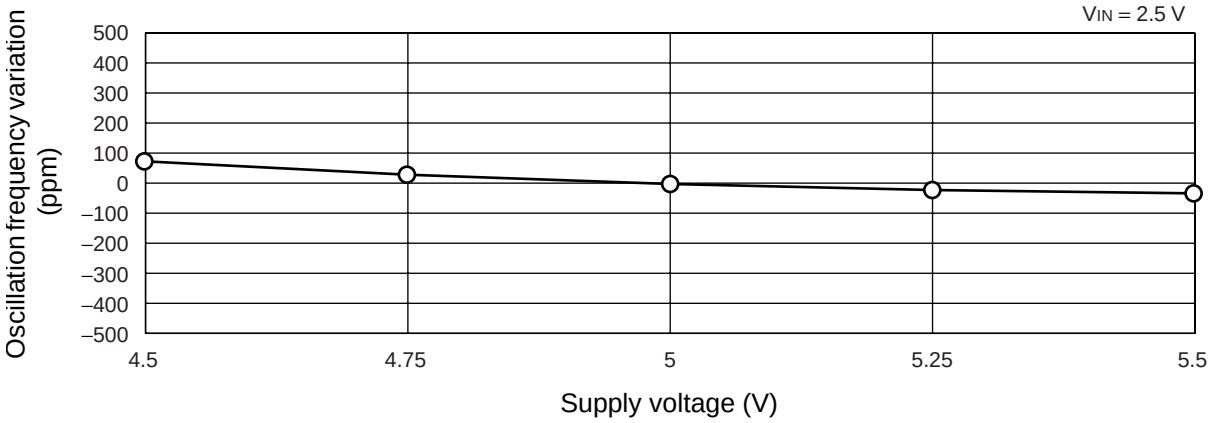
■ TYPICAL CHARACTERISTICS

Part number : FAR-M3DC-70M000-E100

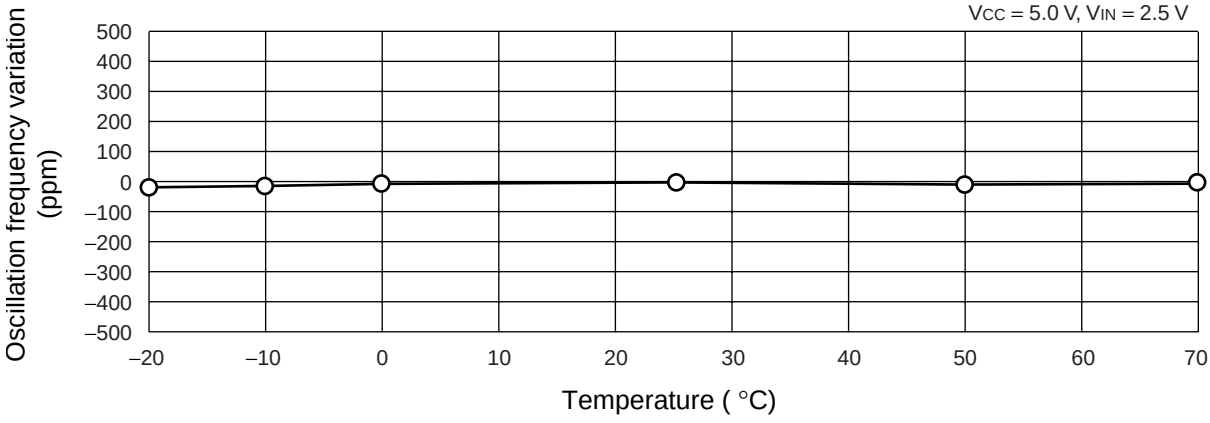
1. Control Voltage vs. Oscillation Frequency Variation



2. Supply Voltage vs. Oscillation Frequency Variation



3. Temperature Characteristics



■ PART NUMBER DESIGNATION

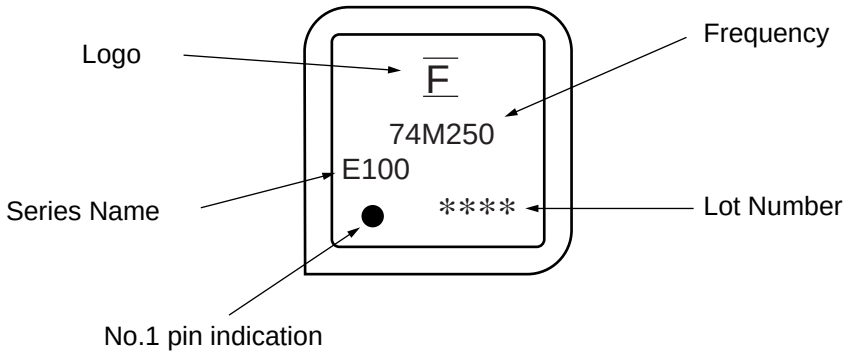
[Designation example]

FAR – M3DC – □□□□□□ – E100
(1) (2)

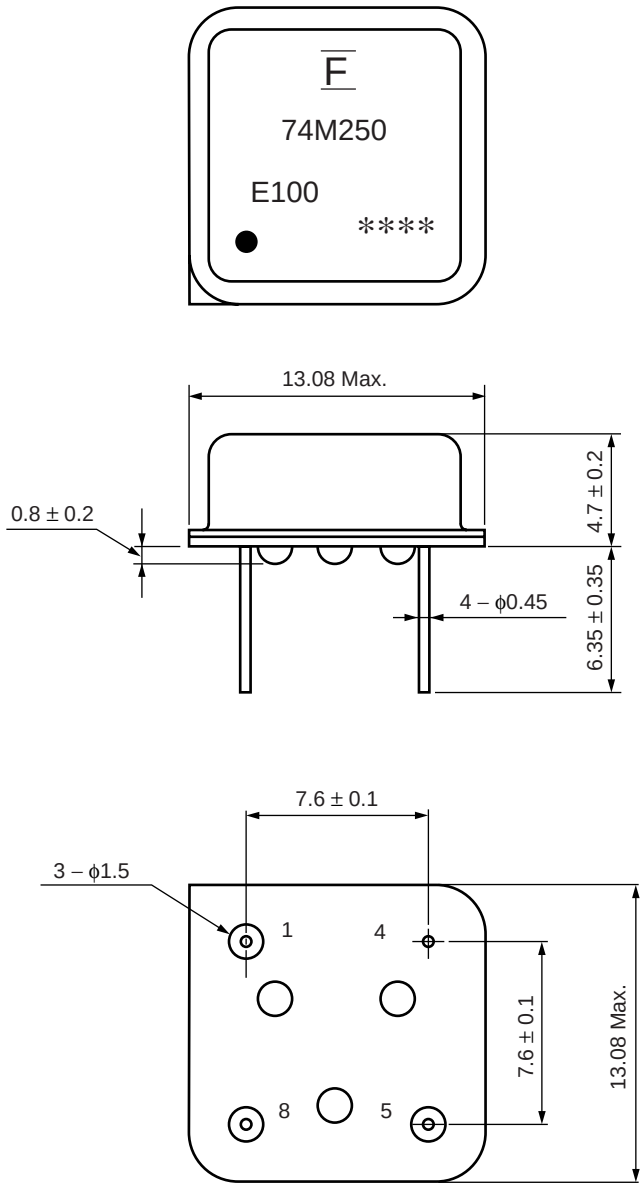
(1) : Frequency : This specifies the nominal frequency using six alphanumeric characters. M indicates the decimal point.

(2) : Taping : "–R" means 100 pcs/reel

■ MARKING



■ PACKAGE DIMENSION



Dimensions in mm.

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